GOVT. NAVIN COLLEGE HASOUD, DIST.- JANJGIR-CHAMPA (C.G.)

Department of Chemistry

COURSE PROGRAM OUTCOME & SPECIFIC OUTCOME

S.N.	Course/Program	Program Outcome	Program Specific Outcome
01	B.Sc.- Chemistry	**PO1. DEEP THINKING**	**PSO1**
		The curriculum is designed such way that students should acquire and ability to observe accurately and objectively. They should be able to solve the problems and also think scientifically, independently and draw rational conclusions.	To provide the basic principles of all branches of chemistry knowledge of chemical principles and make them independent for the effective application of it.
		PO2.IMPRESSIVE COMMUNICATION	**POS 2**
		The medium of instruction for this course is English. English being the language of world students become habitual to communicate in English using language of Chemistry.	To provide thorough knowledge of laboratory skills so that students can prepare for the experimental setup, actual working of equipment, obtain experimental data and interpretation of it. This then interpreted using theoretical principles.
		PO3 SOCIAL INTERACTIONS	**PSO3**
		In this course students are made aware of environment related issues. They are made aware of optimal use of fertilizers, water, fuels and drugs.	To make the students self sufficient in understanding and handling the various issues that may arise related to chemistry.
		P04 INFLUENTIAL CITIZENSHIP	
		In this program students are made aware of pollution problems waste water management, water treatment etc. They are also made aware importance of energy and water, food, fuels, general hygiene and cleanliness etc.	
		PO5 MANNERS	
		In this program students are made alerts regarding misuse of food adulteration, chemical technology, poisons, fungicides, pesticides and chemical and nuclear weapons	
		PO6 ATMOSPHERE AND STABILITY	
		Being Chemistry students they become well conversant with various pollutants their sources and their impact on bio-system. So they become well versed with protection and conservation of environment.	
		PO7 SELF DIRECTED AND LIFE LONG LEARNING	
		Program curriculum inculcates the curiosity and problem solving approach which makes them self directed and learning becomes a continuous process throughout the life.	

S.N.	Class	Course	Course Outcome
1.	**B.Sc. I Year Chemistry (Annual Pattern)**	**Paper-I Inorganic Chemistry**	This course enables students to understand basic laws regarding Atomic Structure, Periodic Properties, Chemical bonding (Ionic & Covalent Bonding). Students are also made aware of s-Block Elements, p-Block Elements, Chemistry of Noble Gases & Theoretical principles in Quantitative Analysis.
		Paper-II Organic Chemistry	Students are made aware of Basic organic Chemistry, Stereochemistry, Conformational Analysis and Chemistry of Aliphatic Hydrocarbon; like- Carbon-Carbon Sigma(**σ**) Bond, Carbon-Carbon Pi (**π**) Bond and also made aware of Aromatic Hydrocarbons.
		Paper-III Physical Chemistry	This course enables students to understand Basic mathematical concepts regarding Logarithmic relation, Differentiation of functions, Maxima & Minima, Probability Theory and also made aware of Chemistry of Gaseous State, Liquid State, Colloids & Surface Chemistry, Solid State, Chemical kinetics and Catalysis.
		Practical Lab- Inorganic , Organic & Physical Chemistry	Chemistry is an experimental subject; practical course is intended to achieve the basic skills required for understanding the concepts and authenticating the basic laws and principles of chemistry &helps in development of practical skills of the students. **Inorganic Chemistry-**Semi micro Qualitative Analysis of Mixtures, Titrations (Acid-Base, Redox, Iodo/Iodimetric titrations). **Organic Chemistry-** Demonstration of Laboratory Glassware & Equipment, Purification of Organic Compounds by Crystallizations using different Solvents, Determination of the Melting Points of Organic Compounds and Qualitative Analysis of Functional Groups. Physical Chemistry- Surface Tension Measurements, Viscosity Measurements, Chemical Kinetics and Preparation of Colloidal Solutions.
2.	**B.Sc. II Year Chemistry (Annual Pattern)**	**Paper-I Inorganic Chemistry**	This course enables students to understand basic laws regarding Chemistry of Transition Series elements, Oxidation & Reductions, Coordination Compounds, Chemistry of Lanthanides & Actinides Elements, Acids Base Chemistry and Non-aqueous Solvents.

		Paper-II Organic Chemistry	This course enables students to understand basic laws regarding Chemistry of Organic Halides, Alcohols, Phenols, Aldehydes & Ketones, Carboxylic Acids and Organic Compounds of Nitrogenes.
		Paper-III Physical Chemistry	Students are also made aware of Thermodynamics, Ionic Equilibria, Phase Equilibrium and Photochemistry.
		Practical Lab- Inorganic , Organic & Physical Chemistry	Chemistry is an experimental subject:- **Inorganic chemistry-** Qualitative Semi micro Analysis And Volumetric Analysis. **Organic Chemistry**- Qualitative Analysis of Functional Groups and Preparation of Organic Compounds. **Physical Chemistry**- Transition Temperature, Thermochemistry, Phase Equilibrium and Molecular Weight Determination.
3.	**B.Sc. III Year Chemistry (Annual Pattern)**	**Paper-I Inorganic Chemistry**	Students are made aware of Metal ligand Bonding in Transition Metal Complexes, Magnetic properties of Transition Metal Complexes, Organometallic Chemistry, Bioinorganic Chemistry and Hard & Soft Acids-Basis.
		Paper-II Organic Chemistry	This course enables students to regarding Organometallic Chemistry(Organosulfur), Biomolecules (like- Carbohydrates, Proteins & Nucleic Acid), Synthetic Polymers, Synthetic Dyes, Spectroscopy (like- Mass, Infrared, Ultraviolet & Visible, NMR, ^{13}CNMR Spectroscopy).
		Paper-III Physical Chemistry	This course enables students to understand basic laws regarding Quantum Mechanics, Spectroscopy (like- Rotational, Vibrational & Raman Spectroscopy), and Thermodynamics.
		Practical Lab- Inorganic , Organic & Physical Chemistry	Chemistry is an experimental subject:- **Inorganic chemistry-** Synthesis of Complexes, and Gravimetric Analysis of Complexes. **Organic Chemistry**- Laboratory technics (like Steams distillation & Column Chromatography), Qualitative analysis of Binary Mixture and Synthesis of Organic Compounds. **Physical Chemistry-** Electrochemistry, Refractometery & Polarimetry, Molecular Weight Determination and Colorimetry.
4.	**M.Sc. I Semester Chemistry (Semester Pattern)**	**Paper-I Inorganic Chemistry**	This course enables students to understand Stereochemistry & Bonding in Main Group Compounds, Metal Ligand Bonding, Electronic Spectra of Transition Metal Complexes, Magnetic Properties of Transition Metal, Symmetry &

			Metrix Representation and Group Theory in Chemistry.
		Paper-II Organic Chemistry	This course enables students to understand Reaction Intermediates, Nature of Bonding in Organic Molecules, Stereochemistry, Reaction Mechanism (On the Basis of Structure & Reactivity), Pericyclic Reactions and Molecular Rearrangements.
		Paper-III Physical Chemistry	Students are made aware of Quantum Chemistry (Approximation Methods, Angular Momentum), Atomic Chemistry (Electronic Structure of Atom & Molecular Orbital Theory), Chemical Dynamics, Surface Chemistry(Adsorptions & Missiles) and Macromolecules.
		Paper-IV Spectroscopy And Mathematics / Biology for Chemists	This course enables students to understand Spectroscopy (Unifying Principles), Microwave Spectroscopy, Raman Spectroscopy and Vibrational Spectroscopy. Students are made aware of Vector & Metrix Algebra, Elementary Deferential Equations, Permutation & Probability, Cell Structure & Functions, Carbohydrates, Lipids, Amino Acids, Peptides, Proteins and Nucleic Acids.
		Lab-01 Organic Chemistry	Qualitative Semi micro Analysis, Organic Synthesis (Bromination, Nitrations, Oxidation, Diazotization) and Quantitative Analysis.
		Lab-02 Analytical Chemistry	Error Analysis & Statistical Data Analysis, Volumetric Analysis, Chromatography, Instrumental Titrations (pH-Metry , Potentiometry, Conductometry), Flame Photometry, Spectrophotometry, Nephelometry, Applications of Computer in Chemistry.
5.	**M.Sc. II Semester Chemistry (Semester Pattern)**	**Paper-I Inorganic Chemistry**	Metal Ligand Equilibrium in Solution, Reaction mechanism of Transition metal Complexes, Metal Complexes, Metal Carbonyls, Nitrosyles, Isopoly & Heteropoly Acid And Salt.
		Paper-II Organic Chemistry	Electrophilic Substitution Reaction (Aliphatic & Aromatic), Nucleophilic Substitution Reactions(Aliphatic & Aromatic), Free radicals Reactions, Addition to Carbon-Carbon Multiple Bonds, Addition to Carbon-Hetero Multiple Bonds, Elimination Reactions.
		Paper-III Physical Chemistry	Classical Thermodynamic, Statistical Thermodynamics, Non-Equilibrium Thermodynamics, Electro-Chemistry, Electro-Catalysis, Electron Diffraction, Neutron Diffraction.

		Paper-IV Spectroscopy Diffraction Methods And Computer for Chemists	Atomic Spectroscopy, Molecular Spectroscopy, Photo-Electronic Spectroscopy, NMR, ESR, Photoacoustic Spectroscopy, X-Ray Diffractions, Computer Fundamentals, Programing in C, Programing in Chemistry & Uses of Computer Programs.
		Lab-01 Inorganic Chemistry	Semi micro -Analysis, Quantitative Analysis(Volumetric & Gravimetric Methods), Estimations.
		Lab-02 Physical Chemistry	Adsorptions, Phase Equilibria, Chemical Kinetics, Conductometry, pH-Metry, Potentiometry, Polarimetry, Molecular weight Determination.
6.	**M.Sc. III Semester Chemistry (Semester Pattern)**	**Paper-I Applications of Spectroscopy**	Vibrational Spectroscopy, ESR, NMR, UV-Visible Spectroscopy, ^{13}CNMR, Mass Spectroscopy.
		Paper-II Bioinorganic & Bioorganic Chemistry	Metal ions in Biological System, Transport & Storage of Dioxygen. Enzymes, Kinds of Reaction Catalyzed by Enzymes, Enzyme Models.
		Group-B Paper-III Physical Organic Chemistry	Concepts in Molecular Orbitals & Valence Bond Theory, Salvations & Solvents Effects & Acids Bases Electrophiles Nucleophiles Catalysis, Principles of Reactivity, Radicles & Pericyclic Reactions, Nucleophilic & Electrophilic Reactivity, Steric And Conformational Properties.
		Group- B Paper-IV Chemistry of Heterocyclic Compounds	Nomenclature of Heterocyclic Compounds, Aromatic Heterocycles, Non-Aromatic Heterocycles, Heterocyclic Synthesis, Small-ring Heterocycles, 6-membered Heterocycles with one Heteroatoms, 6-membered Heterocycles with Two or More Heteroatoms, Benzo fused 5-Membered Heterocycles, 7-Membered & Large membered Heterocycles.
		Lab-01 General Chemistry	Physical Chemistry- Conductometry, Colorimetry, pH-Metry, Potentiometry, Distribution Coefficients, Partial Molar Volume. Inorganic Chemistry- Instrumental Methods & Analytical Techniques, Separation & Determination, polarography, Flame Photometry Determination, Quantitative& Qualitative Analysis. Organic Chemistry- Quantitative Analysis Techniques, Functional Group Estimations, Chromatography. Analytical Chemistry

6.	**M.Sc. IV Semester Chemistry (Semester Pattern)**	**Paper-I Photochemistry and Solid State Chemistry**	PHOTOCHEMISTRY- Photochemistry reaction, Determination of reaction mechanism, Photochemistry of alkene, Photochemistry of carbonyl compounds, Photochemistry of aromatic compounds, SOLID STATE CHEMISTRY-Solid state reaction ,crystal defects and non-stoichiometry, electronic properties and band theory
		Paper-II Biophysical and Environmental Chemistry	BIOPHYSICAL-Biological cell and its constituents, bioenergetics, biopolymer interaction, thermodynamics of biopolymer solutions, cell membrane and transport of ions, biopolymer and their molecular weights ENVIRONMENTAL CHEMISTRY-Environment hydrosphere, water quality parameter. industrial pollution
		Group-B **Paper-III Medicinal Chemistry**	Drug design pharmacokinetics, pharmacodynamics, antineoplastic agents, local anti-infective drug, cardiovascular drug, psychoactive drug
		Group- B **Paper-IV Chemistry of Natural product**	Terpenoids, alkaloids, steroids and hormones, plant pigments, porphyrins and carotenoids
		Lab-01 Special Organic Lab	Qualitative analysis- separation purification, multi-stage-synthesis of organic compounds, extraction of organic compounds of natural products, paper chromatography, spectroscopy